Fat (Crude) or Ether Extract in Some Pet Food

Scope

This method is to be used only for the determination of percentage fat in baked and/or expanded pet foods and on intermediate moisture pet foods.

Summary

The sample is treated by acid hydrolysis and extracted with ethyl ether and petroleum ether. The weight of the extract corrected for the blank is the corrected weight of fat extracted and is used to calculate the percentage fat.

Comments

This method is not suitable for canned, fresh, or frozen pet foods. All evaporations should occur in the hood. A blank (no sample, just reagents) should be run with each set of samples.

Apparatus and Materials

A. Mojonnier Fat-Extraction Flask.

B. Cotton.

C. Erlenmeyer flask, 150 ml.

D. Glass Beads.

E. Florence flask, 100 ml.

F. Small glass funnels.

G. Heated water bath, 70-80^{o}C.

H. Cooling bath.

I. Steam bath.

J. Oven, 100°C.

Reagents

A. Ethanol: 95%.

B. Hydrochloric acid: 25 + 11. Add 250 ml of concentrated HCl to 110 ml of deionized water and mix.

C. Ethyl ether: Analytical Reagent.

D. Petroleum ether, bp < 60°C.

Procedure

A. Place 2.0 g of the ground sample (weighed to the nearest 0.0001 g) in a Mojonnier Fat-Extraction Flask.

B. Add 2 ml of ethanol and shake to moisten all of the particles of the sample.

C. Add 10 ml of the 25 + 11 hydrochloric acid, mix well and place the flask in a water bath at 70-80°C for 30 to 40 minutes. Shake the sample frequently.

D. Cool the flask and sample to room temperature and add enough ethanol to raise the liquid level into the neck of the flask.

E. Add 25 ml of ethyl ether, stopper the flask and shake vigorously for one minute.

F. Carefully vent the flask so that no solvent is lost.

G. Wash any adhering solvent and fat from the stopper back into the flask with drops of petroleum ether.

H. Add 25 ml of petroleum ether, stopper the flask and shake vigorously for one minute.

I. Allow the flask to stand until the upper layer is clear.

J. Decant the ether-fat solution from the flask through a filter of cotton into a 150 ml erlenmeyer flask containing a few glass beads.

K. Rinse the tip of the flask with a few mls of petroleum ether.

L. Re-extract the liquids remaining in the extraction flask twice more with 15 ml each of ethyl ether and petroleum ether. Shake for one minute after each addition of each solvent.

M. Decant the ether layer as in steps J and K using the same cotton each time.

N. Wash the lip of the flask, the stopper, the funnel and the end of the funnel with a few mls of a one to one mixture of the two ethers.

O. Evaporate the ether slowly on steam bath under a gentle stream of air. (Perform this evaporation in a hood.)

P. Continue heating on the steam bath for 15 minutes after the solvents have evaporated and then cool to room temperature.

Q. Redissolve the dried fat residue in four 10 ml portions of ethyl ether, filtering each portion through a small cotton pledget into a 100 ml florence flask containing a few glass beads. This flask should have been predried for 30 minutes, cooled in a desiccator, and weighed immediately to the nearest 0.0001 g.

R. Use a fifth 10 ml portion of ethyl ether for rinsing the cotton and the funnel.

S. Evaporate the ether on a steam bath, dry the residue and flask for 90 minutes at 100^{o}C, cool to room temperature in a desiccator and weigh immediately to the nearest 0.0001 g.

Calculations

A. Determine the weight of the fat by subtracting the weight of the flask (step Q) from the weight of the fat and flask (step S).

B. Determine the corrected weight of the fat by subtracting the average weight of the blanks from the weight of the fat (calculations step A).

C. Calculate and report the percentage fat by dividing the corrected weight of the fat

(calculations step B) by the weight of the sample (procedure step A) and multiplying by 100.

Quality Control

A. Monitor the temperature of the water bath with a calibrated thermometer should be 70 - 80°.

B. Monitor the length of time the tubes are set in the water bath. Should be 30 - 40 minutes.

C. Check the temperature of the drying oven with a calibrated thermometer and document on worklist (should be 100 ±2°).

D. Monitor the length of time the flasks and fat are dried. Should be 90 minutes at 100°.

Bibliography

Official Methods of Analysis (1984) 14th Ed., AOAC, Washington, D.C., sec. 7.063